

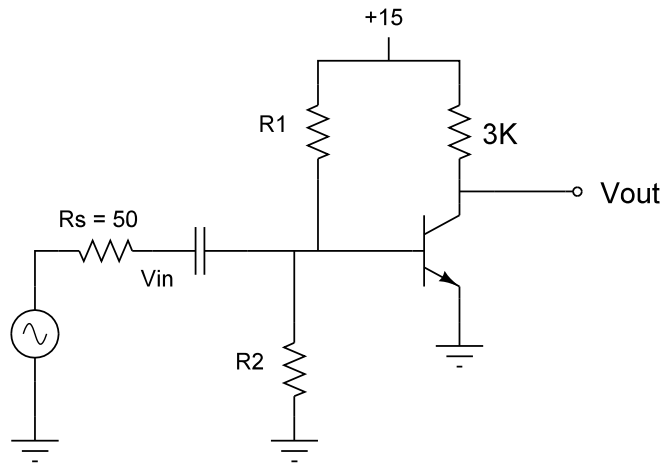
Common-Emitter Amplifier - Small Signal & Large

Goals

The principle goal is to begin investigating biasing and operation of the common-emitter amplifier.

Design

Using the circuit topology shown in figure 1, find values of R1 and R2 that will bias this circuit so that Vout is about 1/2 of Vcc. Note that the input signal is capacitively coupled so as not to disrupt the DC Q point.

Measurements should include:

- 1) Small signal AC gain
- 2) Determine transconductance g_m (see equation 7.62) $g_m = I_c/V_t$
- 3) For small signal, the range of frequencies where the output drops to 0.707 of maximum given a constant level input voltage
- 4) For larger signals, the maximum p-p output voltage without significant distortion.

Simulation

Simulate the circuit with Spice using the 2N2222 model parameters and compare with measured values.

Documentation

Take careful notes in your lab notebook. Compare measured AC gain $A_v = -(I_c R_c)/V_t$ with calculated values (equation 7.21 or 7.22).

Lab Report

The lab report will be one page on which you document the following:

Voltage gain, maximum p-p output, frequency range, and observations about the lab.